

DIURNAL SIGHT RECORDS OF FLAMMULATED OWLS
AND POSSIBLE VERTEBRATE PREY IN WINTER:
THE CASE FOR CAUTION

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Holt (1996) questions my questioning (McCallum 1994a, b) of three Montana sight records of the flammulated owl (*Otus flammeolus*) published by Holt et al. (1987). He goes on to promote the plausibility of those records by revisiting two poorly understood facets of flammulated owl biology: winter range and facultative carnivory. Further discussion of these unusual records, and of flammulated owl biology, is entirely salutary, particularly if it leads to more research on these questions. My main concern in retaining my cautious stance with regard to diurnal sight records in winter in Montana, as well as more general inferences of active carnivory, is that we do not falsely attribute to this owl a level of ecological flexibility that it does not possess.

Four regions of the USDA Forest Service classified this forest owl as sensitive (Verner 1994), independently of my review of the literature (McCallum 1994b) and conservation assessment (McCallum 1994c) of the species. Although this species appears to be common in some ponderosa pine (*Pinus ponderosa*) and semiarid montane mixed conifer stands throughout the western U.S. and southernmost British Columbia, I found three major reasons to be concerned for the future of the flammulated owl: (1) All known clutches contained 2–4 eggs, and hence this species appears to lack the capacity, possessed by some other owls (e.g., snowy owls [*Nyctea scandiaca*], Parmelee 1992 and barn owls [*Tyto alba*], Marti 1992), to produce large clutches when food is superabundant. Coupled with a possible preference for older forests (Reynolds and Linkhart 1992), this demographic inflexibility suggests a species that may not recover quickly from disturbance or habitat alteration. Indeed, Marshall (1988) found only two territories in 1986 in a logged area that had supported 18–20 territories in 1938 (Marshall 1939). (2) Almost all independently verifiable evidence indicates that the flammulated owl subsists entirely on arthropods in the wild. Broad spectrum insecticides used in intensive forest management may have a negative impact on reproductive success if they severely reduce the abundance or diversity of the owl's prey base. (3) Winter (1974) concluded, after a thorough review of available evidence, that the species is a trans-latitudinal migrant. Following a review of evidence obtained more recently, I concurred with Winter's conclusion. If it is true that the flammulated owl is a trans-latitudinal migrant, and further that the bulk of the population winters no further north than central Mexico, as the very limited

evidence presently available suggests (McCallum unpubl. data), then the fate of the species may hinge on habitat quality outside the United States.

The sight records under discussion (Holt et al. 1987, Holt 1996) are inconsistent with items 2 (lack of vertebrates in diet) and possibly 3 (migratory behavior) above. This inconsistency does not mean that they were erroneous. It does suggest that the data presented in support of such records should be beyond question. While I would like very much to believe these records, because their truth would imply that the flammulated owl is much more flexible ecologically than I fear, I do not think the supporting data are beyond question.

What we need for records that extend the verified northern margin of the winter range of the species from the deserts of Arizona and California (American Ornithologists' Union 1983) as far north as Montana is not second-hand sight records, regardless of the qualifications and experience of the observers, but photographs, recordings, and specimens. Only data that can be independently verified should be allowed to change the range of the species so drastically. The same argument holds for diet. Such caution is dictated by both the conservation implications of these records, and by standard scientific practice. Items 2 and 3 above constitute null hypotheses against which the Montana records must be tested. I cannot reject those null hypotheses with anything approaching 95% confidence.

The January 1965 record is the most believable of the three, because it involved extended observation of a bird in captivity by an experienced birder with field guides in hand. Indeed, grounded flammulated owls are often picked up after snowstorms (e.g., Ligon 1968, Webb 1982). The major doubt about this record is its date, because memory can become inaccurate over long periods of time. Holt (pers. comm.) informs me that the person who found it remembered the date unhesitatingly as January, when interviewed in the 1980s. In fact, my only negative comment about this record was that it was "dubious" as compared to several specimen records. One can hardly disagree with such a comparison.

The dates of the two 1981 records are not overly problematical, as November sight records have been accumulating from throughout the U.S. breeding range of the species in recent years (McCallum unpubl. data). It is the implication of active hunting of vertebrates that is prob-

lematical. In his commentary, Holt (1996) reviews records of vertebrate remains associated with flammulated owls, particularly in their nests. It is clear that captive birds will readily consume vertebrate remains, but I have made this point clearly myself (McCallum 1994a, b). In two cases, vertebrate remains have been found in flammulated owl stomachs (McCallum 1994a, b, Holt 1996). In several cases vertebrate remains were found in or below active nests. In none of these cases, however, was a flammulated owl seen to capture or even attack a vertebrate, including the new data supplied by McKeever (Holt 1996). Even the shrew found in the stomach of a British Columbia bird in November (Cannings 1994) could have been found dead while the owl was foraging in the leaf litter for earwigs, which also were present in the stomach.

The 20 December 1981 record is the only report of active hunting of vertebrates known to me. Perhaps this bird was not hunting, but instead had been flushed by mobbing passerines. F.R. Gehlbach and I witnessed mobbing of a flammulated owl that we flushed from a nest in New Mexico. Without more details, one cannot be confident that the owl in this case was attempting to capture another bird. This and the other 1981 record are the only reports known to me of foraging in full daylight by this completely nocturnal species. Although time of day was not mentioned in the published account (Holt et al. 1987), Holt has confirmed (D.R. Holt, pers. comm.) that both were diurnal. Given the uniqueness of these records if they are true, I would expect more confirmatory details, on such features as iris color, overall shape, flight characteristics, number of times passerines were "chased," etc.

In his commentary, Holt (1996) has scrutinized my writings for inconsistencies, rather than providing confirmatory details. Inconsistencies in my review of the topics of the killing and eating of vertebrate prey (McCallum 1994a, b) stem from the inconsistency of the evidence. The evidence for these behaviors is both scanty and entirely circumstantial (in the case of killing). Yet, I chose not to censor these anecdotes. Indeed, I went as far as repeating some very dubious statements by Karalus and Eckert (1974), in the interest of completeness. Having reported all the data I could find that supported carnivory, I was unconvinced by the strictly circumstantial evidence they provided. Holt's (1996) implied argument that flammulated owls should be able to kill vertebrates because similar-sized northern pygmy-owls (*Glaucidium gnoma*) do so is even less convincing. I consider extrapolating from *Glaucidium* to *Otus* extremely risky. Even the larger *Otus* species are mainly insect eaters according to Marshall (1967), so the size similarity between northern pygmy-owls and flammulated owls is not so relevant as their phylogenetic differences.

In summary, I must say that I remain less than totally convinced that the birds seen clutching a vole and "chasing passerines" during broad daylight were flammulated owls. Although I tend to believe the account of the bird found

in a blizzard, my personal opinion is that it is insufficiently documented to become part of the record of the range of this species. McKeever's observation that a pair of captive, breeding flammulated owls prefer large dead mice to insects (Holt 1996) supports the idea that carcasses of vertebrates found in flammulated owl nests in the wild may have been taken there by adults of this species. Ironically, such an interpretation argues against active hunting and/or killing. If dead vertebrates (e.g., mice) are preferred, the most plausible reason they so seldom appear in the diets of adults and nestlings (McCallum 1994a, b) is that live vertebrates are uneconomical or impossible to obtain. Clearly, an experimental study of both prey preference and the ability to capture and kill vertebrates would be highly desirable. Indeed, I hope that the major outcome of the present discussion will be increased efforts by ornithologists and birders to learn whether flammulated owls can and do kill vertebrates, and whether they winter regularly anywhere inside the United States.

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